

## WEATHER AND CIRCULATION OF APRIL 1972

### Highly Variable Over Central and Eastern United States, Continued Drought in the Southwest

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#### 1. MEAN CIRCULATION

The Northern Hemisphere circulation was characterized by generally fast westerlies at middle and high latitudes during April, as an area of blocking over the North Pacific Ocean moved southward and the strong Scandinavian block that had prevailed during much of the winter was replaced by a trough (figs. 1-3). A deep Low developed near the Taymyr Peninsula, displacing southward the remains of the ridge that had prevailed the previous month.

The combination of height falls over the Bering Sea and strong rises over the central Pacific (fig. 3) led to very fast westerlies (19 m/s, 10 m/s above normal) just south of the Aleutians (fig. 4). The increasing midlatitude westerlies in this sector caused the trough that had been in the central Pacific to shear, leaving a weak, low-latitude portion near the dateline while most of the trough advanced to the eastern Pacific (fig. 1). This negative-tilting trough transported some of the momentum of the fast Pacific westerlies southward across the western

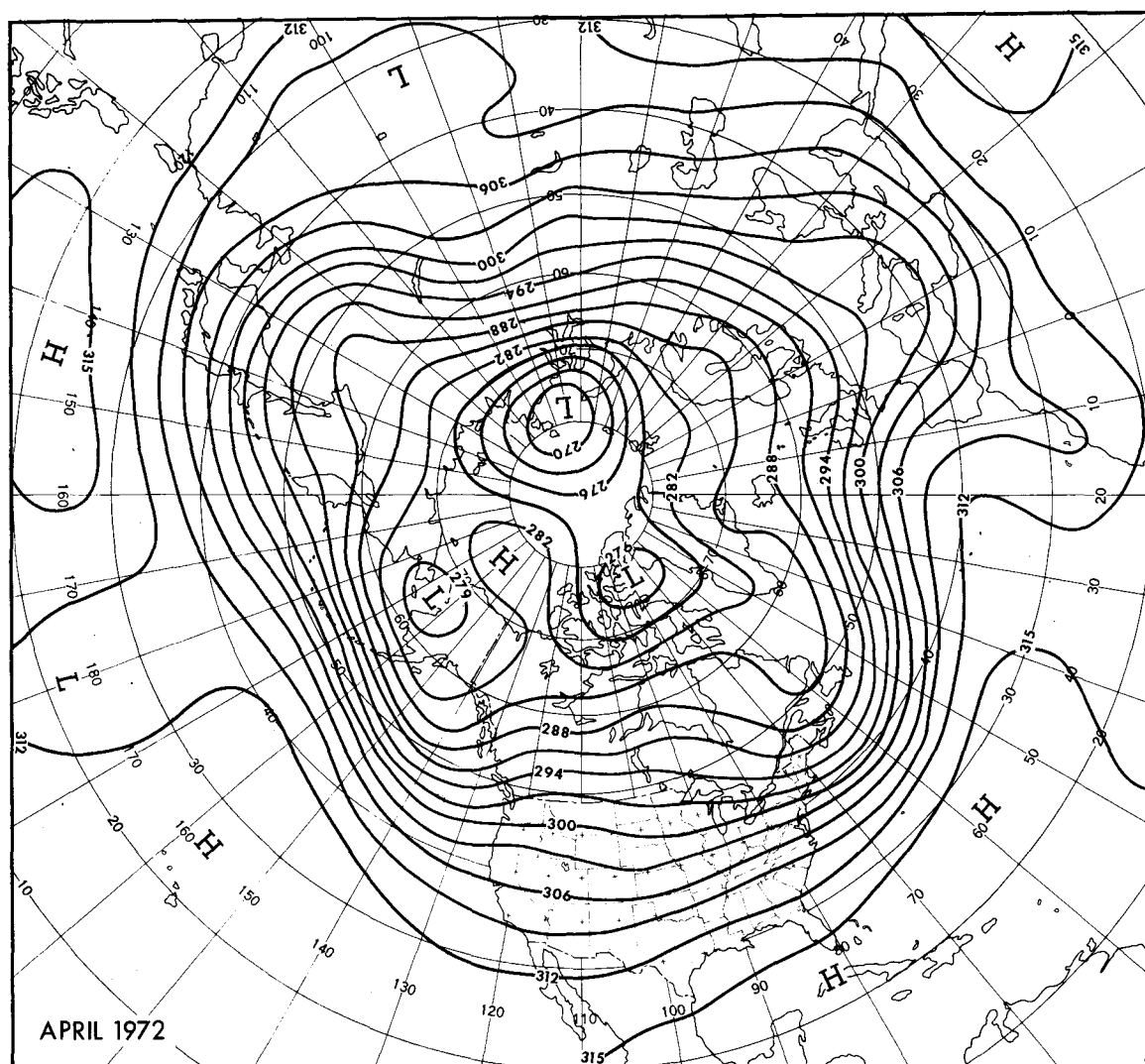


FIGURE 1.—Mean 700-mb contours in dekameters (dam) for April 1972.

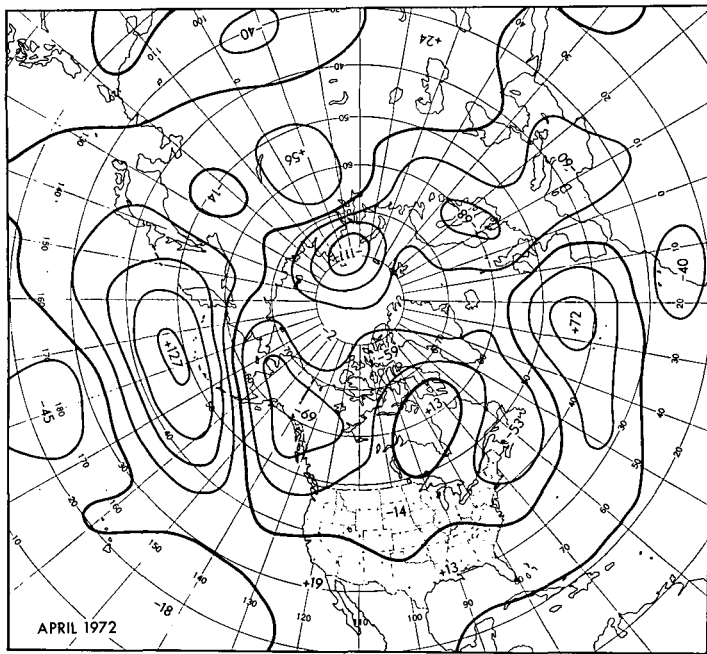


FIGURE 2.—Departure from normal of mean 700-mb height (m) for April 1972.

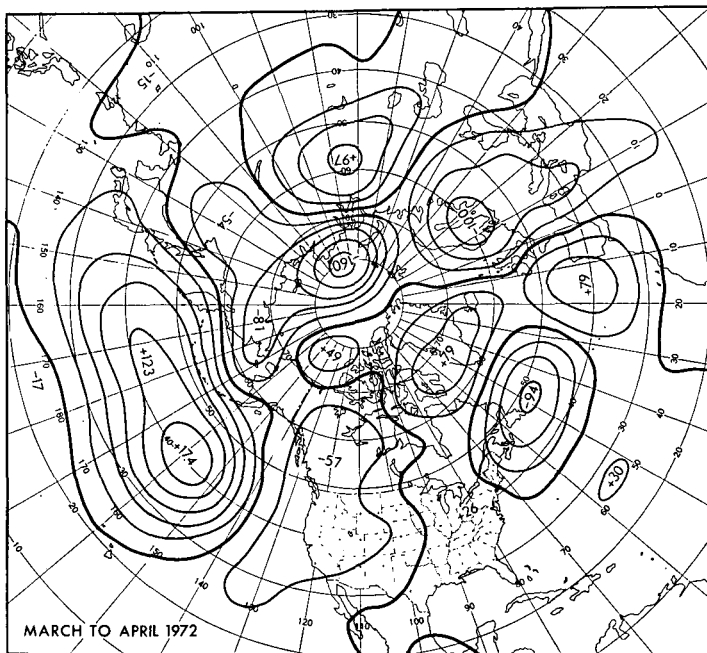


FIGURE 3.—Mean 700-mb height anomaly change (m) from March to April 1972.

United States although heights still remained above normal across the southern border States (fig. 2). The fast flow across the Rocky Mountains generated a lee-side trough over the western Great Plains. Weak blocking, located over Hudson Bay, developed from the progression of the Canadian portion of the strong Rocky Mountain ridge that had given mild weather to the West during February and March (Taubensee 1972, Dickson 1972).

The Hudson Bay blocking helped to deflect the remains of the abnormally cold air that had prevailed over Canada during the winter southeastward over the Northeastern

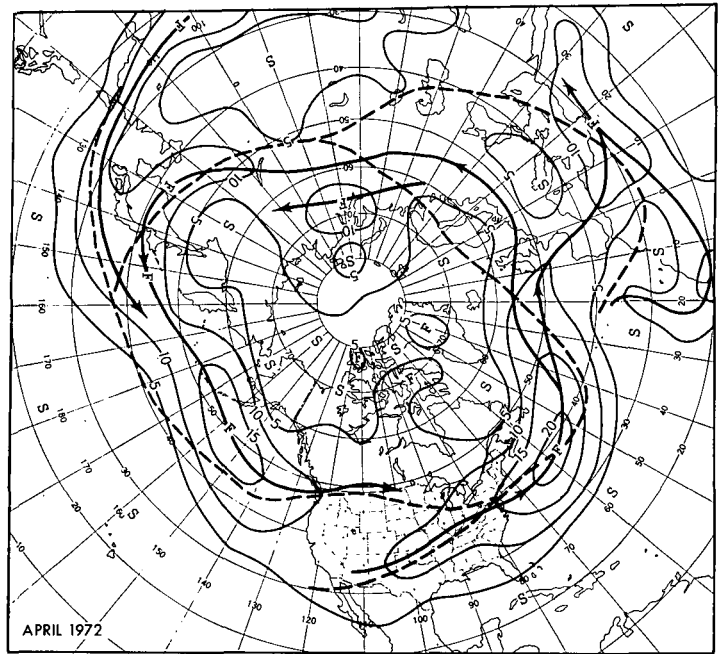


FIGURE 4.—Mean 700-mb geostrophic wind speed (m/s) for April 1972. Solid arrows show the observed axes of maximum wind speed, and dashed lines show the normal April positions. Isotachs are at intervals of 5 m/s.

United States and the Canadian Maritime Provinces, where frequent cyclogenesis was related to a deepening mean trough (figs. 1–3). The Atlantic ridge remained strong and progressed under the influence of increasing westerlies south of the deepening trough. The peak value of 21.5 m/s off the North American Coast (fig. 4) was nearly 9 m/s above normal. In the European sector, the westerlies divided into two branches, one crossing central Europe and the other dipping southward into North Africa.

## 2. TEMPERATURE

The temperature anomaly pattern (fig. 5) bore a close resemblance to the height anomaly pattern (fig. 2) except for a narrow strip of slightly above-normal averages just east of the Rocky Mountains where some warming due to downslope effects across the mountains was likely. The far Southwest and southern Great Plains continued warm, although the West cooled to below normal as far south as northern Arizona as the strong ridge of March was replaced by below-normal heights in April (fig. 2). At Mount Shasta, Calif., April averaged 1.6°F colder than March. Temperatures at three stations in the Pacific Northwest fell from the *much above* category in March to the *much below* category in April. Coming after an unusually warm February and March, the cold weather of April, at times accompanied by freezing temperatures, did much damage to fruit orchards in the Pacific Northwest and Great Basin. Orchards near Medford, Oreg., had to be heated on 17 nights, a near record.

Under the influence of blocking around Hudson Bay, several cold Canadian air masses affected the northeastern

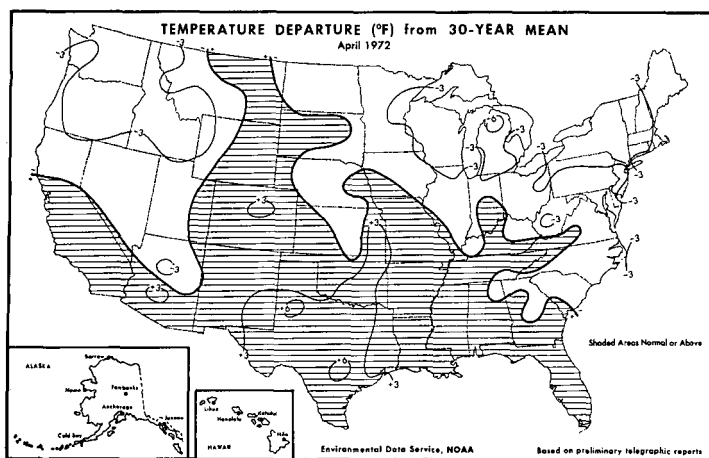


FIGURE 5.—Departure from normal of average surface temperature (°F) for April 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

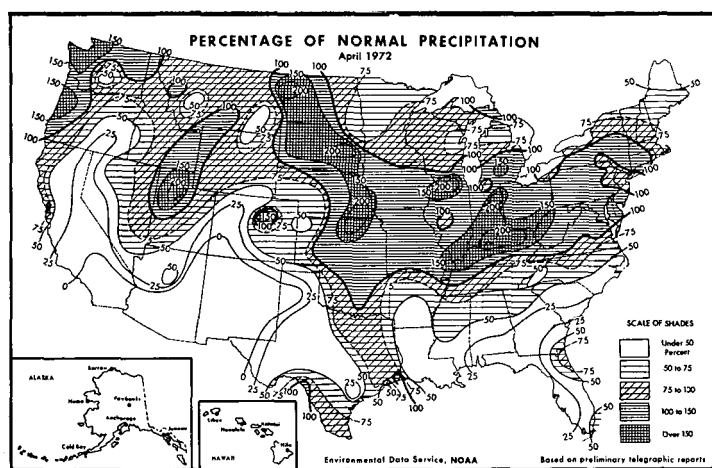


FIGURE 6.—Percentage of normal precipitation for April 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

quadrant of the United States, where temperatures averaged as much as 3°–6°F below normal (fig. 5). It was the coldest April on record at Worcester, Mass., and the coldest since 1943 at Albany, N.Y. St. Cloud, Minn., had its 5th consecutive cold month. Most of Alaska continued very cold as it had been throughout the winter. At Bethel, 14 of the last 15 mo have had below-normal temperatures.

### 3. PRECIPITATION

Under the influence of the trough off the west coast, precipitation was heavier than normal over the north Pacific Coast and portions of the Great Basin (fig. 6). Olympia, Wash., had its wettest April and Eugene, Oreg., its second wettest (table 1). The latter location also had its wettest first 4 mo. of any year on record.

In marked contrast, the Southwest drought, which has been developing since the first of the year (Wagner 1972, Taubensee 1972, Dickson 1972), continued with little or

TABLE 1.—Monthly and seasonal precipitation records established in April 1972.

Location	Amount	Remarks
	(in.)	
Olympia, Wash.	5. 87	Wettest April
Do.	2. 2	Snowiest April
Eugene, Oreg.	5. 80	2d wettest April since 1931
Do.	32. 43	Wettest January–April on record
Pendleton, Oreg.	1. 1	Snowiest April on record (since 1935)
Salt Lake City, Utah	3. 62	3d wettest April on record at airport
Lexington, Ky.	8. 75	2d wettest April
Elkins, W. Va.	6. 95	Do.
Sault Ste. Marie, Mich.	165 +	Greatest seasonal snowfall
Kalispell, Mont.	96. 3	2d greatest seasonal snowfall
Charleston, S.C.	0. 01	Driest month on record
Macon, Ga.	0. 53	2d driest April; driest since 1915
San Diego, Calif.	0. 19	Driest January–April on record
Elko, Nev.	0. 36	4th consecutive dry month
Tucson, Ariz.	0. 00	1st April since 1914 without even trace
Do.	0. 01	Driest January–April on record
Phoenix, Ariz.	0. 00	1st rainless January–April on record; 123 consecutive days no rain
El Paso, Tex.	0. 00	90 consecutive days no rain
Grand Junction, Colo.	0. 33	Driest January–April on record
Cheyenne, Wyo.	0. 80	6th consecutive dry month

no alleviation in most areas except for parts of Utah and Colorado. Several locations reported the driest first 4 mo. on record, and at Tucson and Phoenix, Ariz., this period was completely rainless (table 1).

Heavy precipitation, as much as twice normal in some areas, was quite beneficial in its effects on agriculture in portions of the northern and central Great Plains, where blowing dust had been a problem at times in March and early April. Another area of heavy rainfall—as much as 8 in. or more in northern Kentucky—was associated with some flooding around the middle of the month. Lexington, Ky., and Elkins, W. Va., both reported their second wettest April (table 1).

In response to above-normal heights and westerly anomalous flow, a new dry area with less than a quarter of normal rainfall was located over the Southeast (figs. 2, 6). Charleston, S.C., reported only 0.01 in. for its driest month on record. Agriculture had not been severely affected thus far, due to adequate precipitation there during winter and early spring. This was in marked contrast to the severe spring drought of 1971 in Florida following a very dry winter.

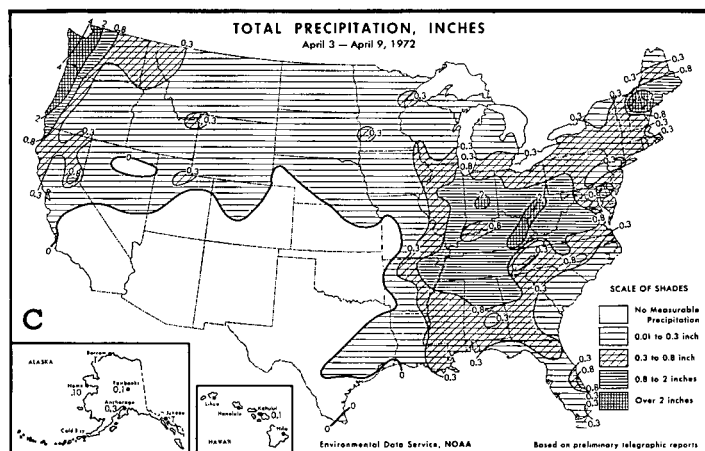
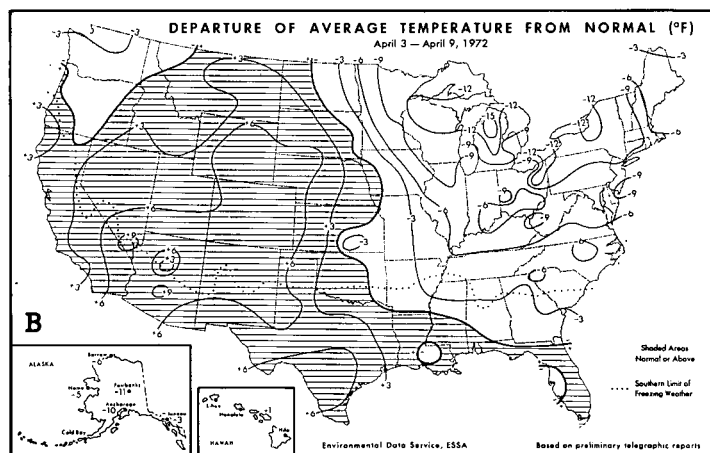
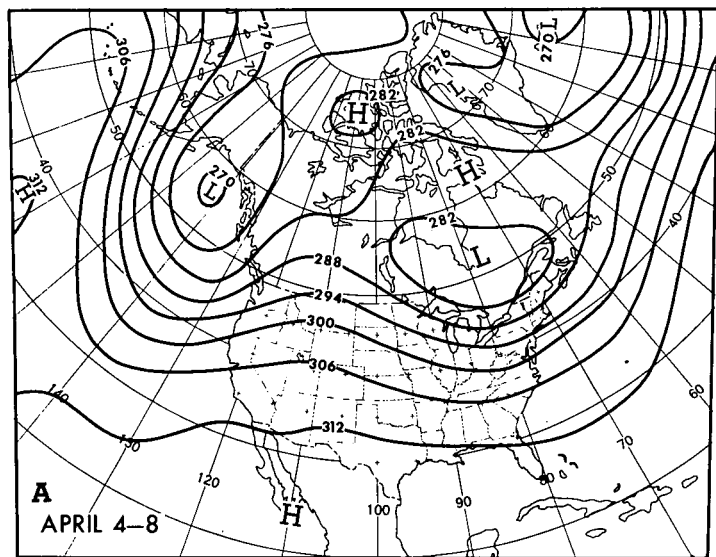


FIGURE 7.—(A) mean 700-mb contours (dam) for Apr. 4-8, 1972; (B) departure from normal of average surface temperature (°F) and (C) total precipitation (in.) for week of Apr. 3-9, 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

#### 4. WEEKLY VARIABILITY

##### April 3-9

The circulation in the vicinity of North America during this period was characterized by a strong, full-latitude trough just off the west coast, a ridge over the Rocky

Mountains, and another trough extending south over the eastern United States from a Low centered near James Bay. Blocking prevailed over northeastern Canada (fig. 7A).

Most of the western half of the United States enjoyed milder than normal temperatures, as much as 9°F above normal in parts of the Southwest. Under the influence of cloudiness and rather heavy rains, the Pacific Northwest was a few degrees cooler than normal (figs. 7B, 7C). The coldest weather occurred from the Great Lakes to New England, where temperatures averaged as much as 10°-15°F below normal for the week. An unusually cold arctic air mass pushed slowly southward and eastward, setting numerous record low temperatures for the month and for so late in the season from the Canadian border as far south as the coast of North Carolina (table 2).

Just behind the leading edge of the advancing cold air, a band of sleet and snow gave some surprising weather to many areas from the Ohio Valley to New England and the mid-Atlantic coast. Rochester, N.Y., had 6.4 in. of snow on the 6th and 7th, a new 24-hr record for April. As much as 0.5-1.0 in. of sleet fell as far south as the Washington, D.C., area on the evening of the 7th. This storm and other systems combined to give fairly heavy precipitation over much of the East, but the Southwest remained rainless (fig. 7C). Mostly light precipitation was the rule from the central Great Basin area across the northern Rocky Mountains and Great Plains to the upper Mississippi Valley and Great Lakes area.

##### April 10-16

Generally flat flow prevailed across the country, with falling heights in the West and rising heights in the East as the circulation features progressed with reduced amplitude from their positions the previous week (fig. 8A). Blocking remained over northern Canada but was unable to deflect cold air from Canada into the United States except over part of the Northeastern States. The temperature anomaly pattern also progressed from the previous week, with cool conditions expanding almost to the Continental Divide and a record spring heat wave covering much of the south-central United States (fig. 8B). Temperatures at some locations averaged as much as 15°F above normal for the week. Several stations in Texas and Oklahoma had maxima over 100°F on April 12, which were not only the highest temperatures so early in the season but set new records for heat for the whole month of April (table 2). Another surge of the same general heat wave set new records for early season warmth in Mississippi and Alabama a few days later.

Precipitation was quite widespread across the Nation with torrential, flood-producing rains along the Ohio River Valley from southern Illinois to eastern Kentucky (fig. 8C). Some locations had as much as 8 in. for the week, and a new 24-hr record for April was established at Rockford, Ill., on the 16th with 3.17 in. In the Southwest, only the southern portions of Arizona, New Mexico, and Texas remained completely dry as beneficial moisture dampened most of the Great Basin, Rocky Mountains,

TABLE 2.—Monthly and seasonal temperature records established in April 1972

Location	Temperature (° F)	Date	Remarks
Roswell, N. Mex.	97	6	Highest so early in the season
San Angelo, Tex.	100	6	Do. Equaled highest for the month
	103	13	Highest for the month
Lubbock, Tex.	96	6	Do.
Albuquerque, N. Mex.	88	10	Do.
Wichita Falls, Tex.	102	12	Do.
Tulsa, Okla.	102	12	Do.
Oklahoma City, Okla.	100	12	Do.
Kansas City, Mo.	92	12	Equaled highest so early in the season.
Jackson, Miss.	90	15	Highest so early in the season
Montgomery, Ala.	91	15	Do.
Beckley, W. Va.	15	9	Equaled lowest for the month
	79	19	Highest for the month
King Salmon, Alaska	-4	8, 15	Lowest for the month
Wichita, Kans.	19	4	Lowest so late in the season
Syracuse, N. Y.	9	7	Do.
	15	8	Do.
Burlington, Vt.	2	7	Do.
	11	8	Do.
	22	27	Do.
Duluth, Minn.	5	8	Do.
	12	25	Do.
Waterloo, Iowa	9	8	Lowest for the month
Dubuque, Iowa	12	8	Lowest so late in the season
Peoria, Ill.	19	8	Do.
Madison, Wis.	9	8	Do.
Grand Rapids, Mich.	16	8	Equaled lowest so late in the season
Toledo, Ohio	12	8	Do.
Dayton, Ohio	15	8	Lowest so late in the season
Binghamton, N. Y.	15	8	Do.
Avoca, Pa.	19	8	Do.
	26	26	Equaled lowest so late in the season
	27	28	Do.
Allentown, Pa.	23	9	Do.
Lynchburg, Va.	26	9	Do.
Roanoke, Va.	22	9	Lowest so late in the season
Charlotte, N.C.	25	9	Do.
Greensboro, N.C.	23	9	Do.
Raleigh-Durham, N.C.	23	9	Lowest for the month
Cape Hatteras, N.C.	26	10	Lowest so late in the season
	33	27	Do.
Eugene, Oreg.	27	22	Do.
Macon, Ga.	37	27	Do.
Chattanooga, Tenn.	34	27	Equaled lowest so late in the season
Boise, Idaho	25	30	Lowest so late in the season
Winnemucca, Nev.	6	30	Do.
Medford, Oreg.	24	18	Do.
	26	30	Do.

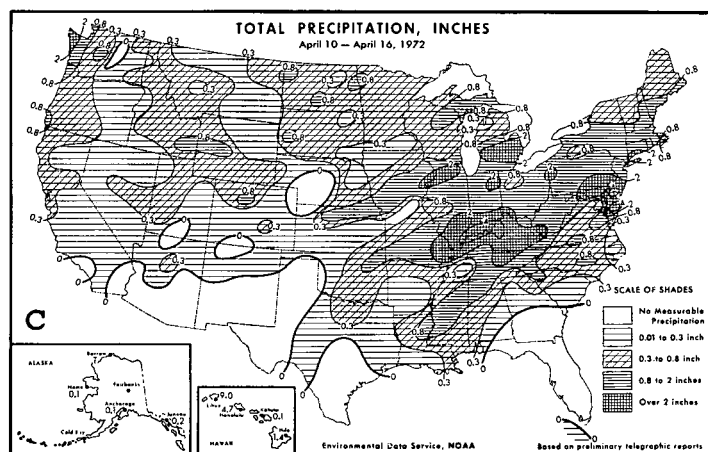
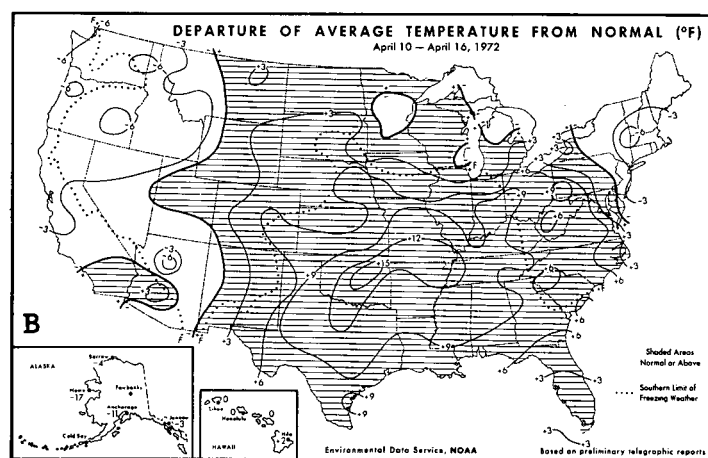
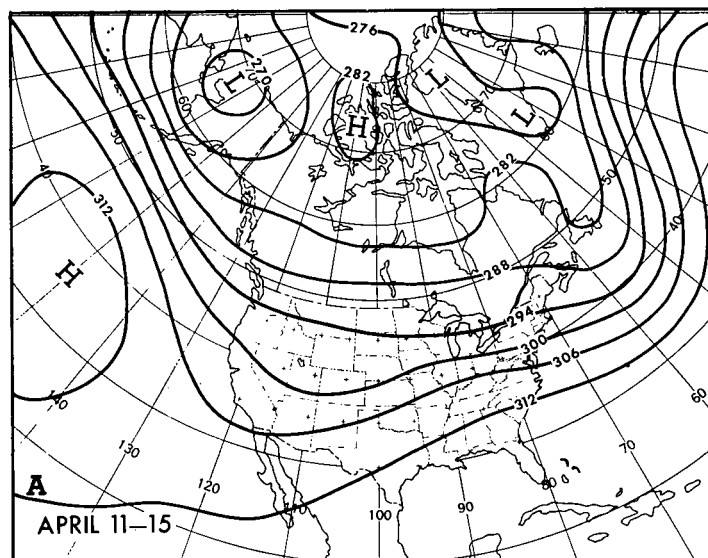


FIGURE 8.—Same as figure 7, (A) for Apr. 11-15, 1972; (B) and (C) for week of Apr. 10-16, 1972.

and Central and Northern Great Plains States. Some of the precipitation over the northern parts of these areas was in the form of snow. The 0.35 in. recorded at Milford, Utah, on the 13th was the first measurable precipitation in 71 days, and 0.18 in. at Dodge City, Kans., on the 15th was the first substantial rain in 4½ mo.

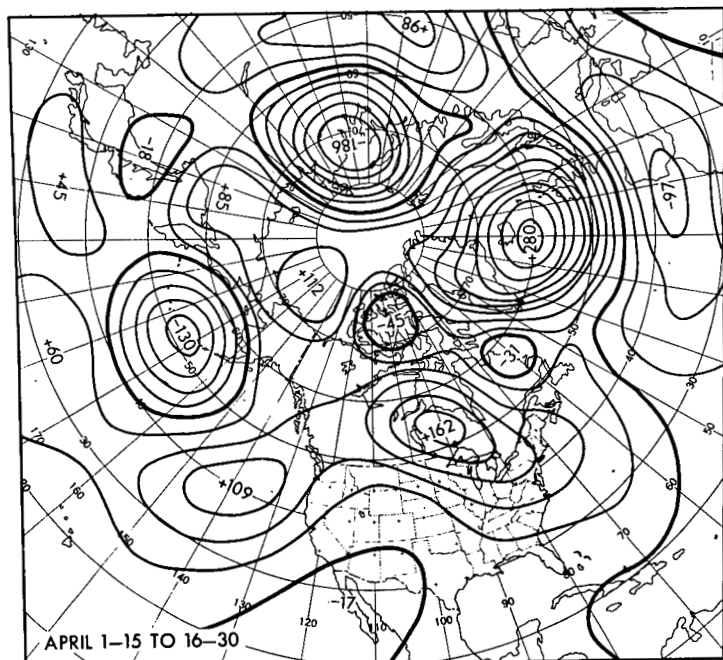


FIGURE 9.—Mean 700-mb height change (m) from the first half to the second half of April 1972.

### April 17-23

Development of a new trough in the Gulf of Alaska after midmonth, together with a relaxation of blocking over northern Canada (fig. 9), helped contribute to further eastward motion of the main features of the height and temperature patterns over the United States (figs. 10A, 10B). A portion of the western trough sheared off and advanced to Minnesota, as the north-central part of the country became cooler and wetter (figs. 10B, 10C). A rather heavy late-season snow fell in portions of the northern Great Lakes. Some of the blocking in Canada retrograded to the Beaufort Sea, while the remainder tended to drift southward to between Hudson Bay and the Great Lakes, where 700-mb heights rose by 162 m between the first and second halves of April (fig. 9, 10A). The circulation over the Atlantic amplified markedly during this week as vigorous deepening occurred near Newfoundland and a strong ridge built over Iceland. Much of the large height rise near Iceland during the last half of April (fig. 9) also occurred during this week.

In the United States, precipitation continued rather heavy in the Ohio Valley under a broad southwesterly current (fig. 10A, 10C). Warm air briefly reached as far north as southern New England, with temperatures in the mid-80s on one afternoon. A few tornadoes and severe thunderstorms were observed in the middle of the country, but most of the Southwest remained dry as range conditions deteriorated and forest fire danger became more acute.

### April 24-30

Heights rose strongly over southern Canada between the slowly progressing Gulf of Alaska trough and a retro-

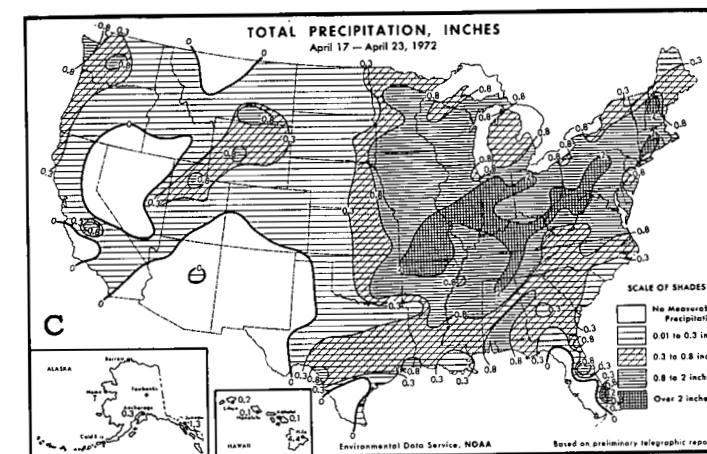
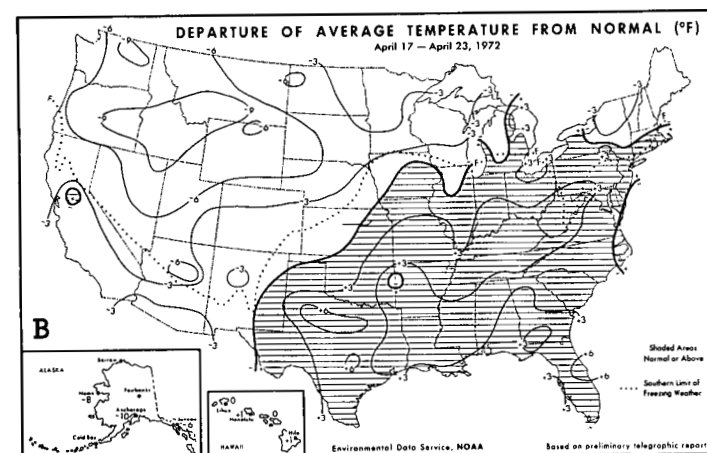
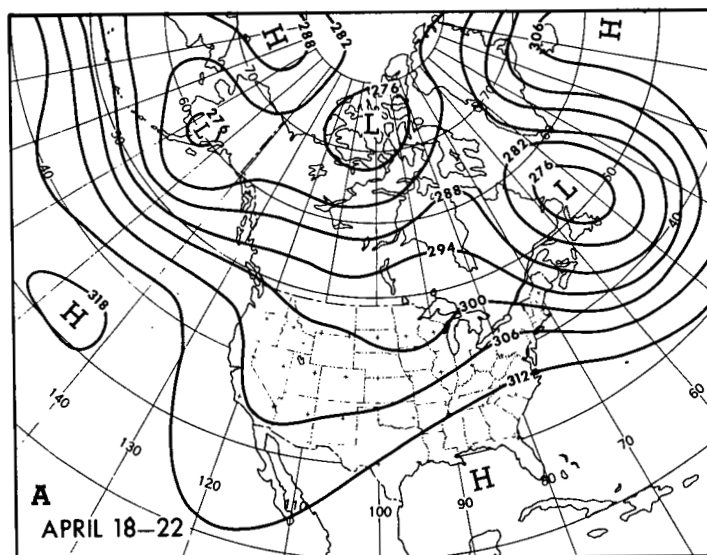


FIGURE 10.—Same as figure 7, (A) for Apr. 18-22, 1972; (B) and (C) for week of Apr. 17-23, 1972.

grading trough over southeastern Canada (fig. 11A). A slowly moving trough and its associated surface storm systems produced heavy precipitation and rather low temperatures from the northern Great Basin to the Central Great Plains States, where temperatures averaged as much as 12°F below normal (fig. 11B, 11C). A foot of snow fell at Denver, Colo., where the total water equivalent of the precipitation was over 3 in. for the week.



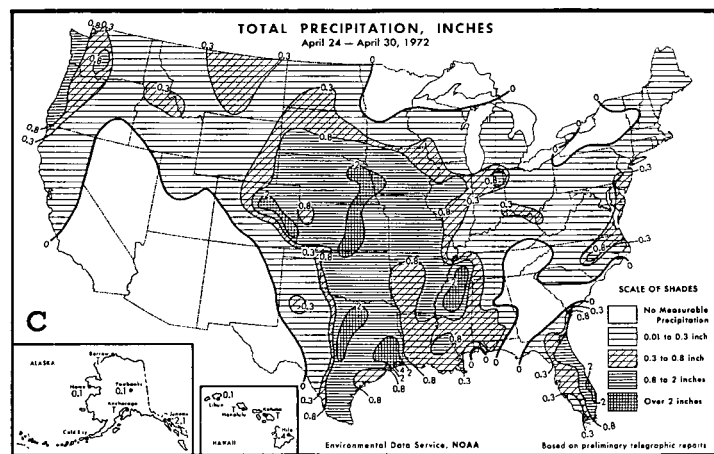
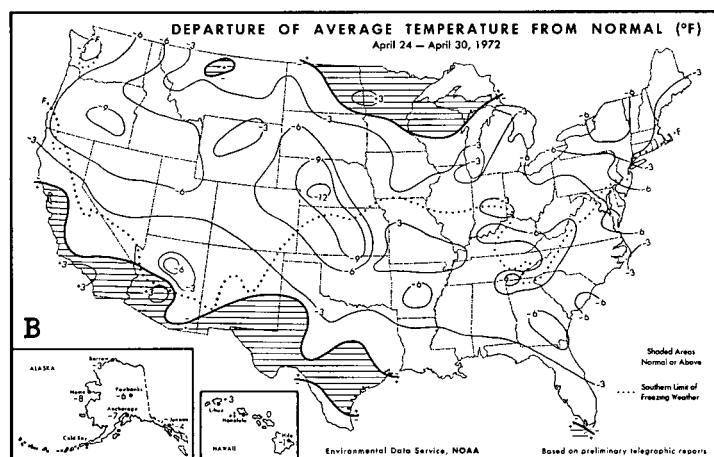
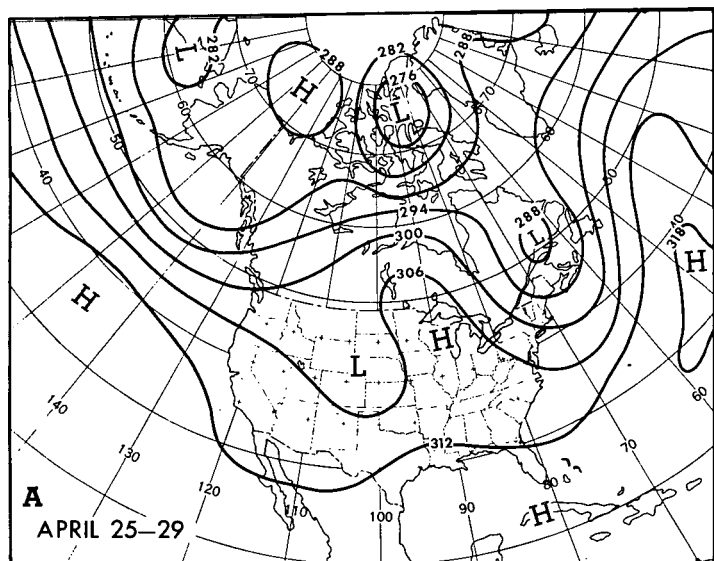


FIGURE 11.—Same as figure 7, (A) for Apr. 25-29, 1972; (B) and (C) for week of Apr. 24-30, 1972.

Precipitation in the East diminished and temperatures fell to 4°-8°F below normal under the influence of increased northwesterly flow. The Pacific Northwest remained cool, with several places reporting record low temperatures for so late in the season (table 2). Strong westerly flow from the Pacific continued the rains over the Washington and Oregon coasts, but most of the Southwest remained rainless. Substantially above-normal temperatures were observed only in the southern portions of California and Arizona and in the Upper Mississippi Valley as practically the entire country had below-normal temperatures during the last week of April. Severe weather in the form of heavy rains, hail, tornadoes, and waterspouts were reported in the San Antonio and Corpus Christi, Tex., areas.

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